

Unit A – Exponential and Logarithmic Equations

PRACTICE TEST

PART A: – NO CALCULATOR

Complete the following section without the use of a calculator.

1. Rewrite $6^{-2} = \frac{1}{36}$ in logarithmic form. 2. Rewrite $\log_3 81 = 4$ in exponential form.

2. Use the laws of logarithms to simplify and then evaluate each expression:

a) $\log_3 135 - \log_3 5$

b) $\log_7 \sqrt[5]{49}$

c) $\log_8 2 + 3\log_8 2 + \frac{1}{2}\log_8 16$

3. Write $\frac{1}{2} \left(4\log x - \log \sqrt{x^5} \right) + \log \sqrt[3]{x^2}$ as a single logarithm.

4. Solve algebraically.

a) $3^{3x-1} = \frac{1}{81}$

b) $64^{x-2} = 16^{4x}$

5. Solve the equation $5^{3x-2} = 3^{x+5}$. Leave your answer as an exact value.

6. Solve $\log_{11} x + \log_{11} (x+1) = \log_{11} 6$. Identify any extraneous roots.

Useful Formulas**Richter Scale**

$$M = \log\left(\frac{I}{I_0}\right)$$

dB

$$L = 10 \log\left(\frac{I}{I_0}\right)$$

PH

$$\text{pH} = -\log[\text{H}^+]$$

PART B: – CALCULATOR ALLOWED

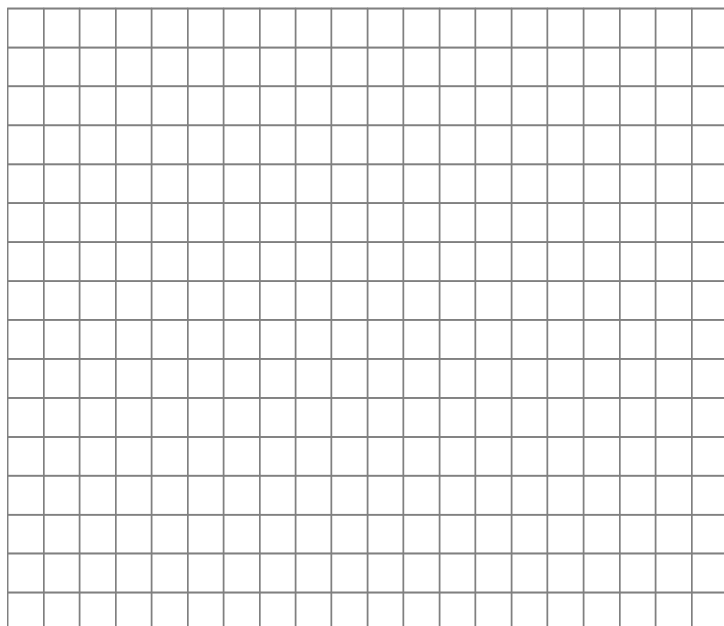
1. Find the difference in pHs of a swimming pool with hydronium ion concentration of 4.4×10^{-8} mol/L and a swimming pool with hydronium ion concentration of 5.7×10^{-8} mol/L.
2. How much more intense is a 104 db sound than a 75 db sound?
3. A chemist has a 20-mg sample of polonium-218. He needs exactly 81.5% of it for an experiment. Given that the half-life of polonium-218 is approximately 3.1 min, how long will it take for the sample to decay to the desired mass?

4. Given $f(x) = -2\log[(x-1)] + 1$.

a) Identify the transformations.

b) Determine the x-intercept.

c) Sketch the function and determine the key features.



| | |
|-------------|--|
| Domain | |
| Range | |
| y-intercept | |
| asymptote | |

5. Solve the equation $2(5^{2x}) - 16(5^x) + 30 = 0$.

6. Solve the equation $\sqrt[3]{256^2} \times 16^x = 64^{x-3}$.

7. Consider the expression $y = \log_2 a$.

- For what values of “ a ” will this expression yield positive numbers, explain
- For what values of “ a ” will this expression yield negative numbers, explain
- For values of “ a ” will this expression be undefined, explain